

WHAT IS CLAIMED IS:

1. A Treponema pallidum fused antigen in which at least two surface antigens of Treponema pallidum are fused.

2. A Treponema pallidum fused antigen in which at least three surface antigens of Treponema pallidum are fused.

3. A Treponema pallidum fused antigen in which two to three surface antigens of Treponema pallidum are fused.

4. The Treponema pallidum fused antigen as claimed in Claim 1, wherein said at least two surface antigens of Treponema pallidum have a molecular weight selected from 47kDa, 17kDa and 15kDa.

5. The Treponema pallidum fused antigen as claimed in Claim 2, wherein said at least three surface antigens of Treponema pallidum have a molecular weight selected from 47kDa, 17kDa and 15kDa.

6. The Treponema pallidum fused antigen as claimed in Claim 3, wherein said two to three surface antigens of

Treponema pallidum have a molecular weight selected from 47kDa, 17kDa and 15kDa.

7. The Treponema pallidum fused antigen as claimed in Claim 4, wherein said surface antigens are fused in the order of said surface antigen with a molecular weight of 47kDa, said surface antigen with a molecular weight of 17kDa, and said surface antigen with a molecular weight of 15kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 47kDa, said surface antigen with a molecular weight of 15kDa, and said surface antigen with a molecular weight of 17kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 15kDa, said surface antigen with a molecular weight of 17kDa, and said surface antigen with a molecular weight of 47kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 15kDa, said surface antigen with a molecular weight of 47kDa, and said surface antigen with a molecular weight of 17kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of

17kDa, said surface antigen with a molecular weight of 15kDa, and said surface antigen with a molecular weight of 47kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 17kDa, said surface antigen with a molecular weight of 47kDa, and said surface antigen with a molecular weight of 15kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 47kDa and said surface antigen with a molecular weight of 17kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 47kDa and said surface antigen with a molecular weight of 15kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 17kDa and said surface antigen with a molecular weight of 47kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 17kDa and said surface antigen with a molecular weight of 15kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 15kDa and said surface antigen with a molecular weight

of 47kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 15kDa and said surface antigen with a molecular weight of 17kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 15kDa and said surface antigen with a molecular weight of 15kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 15kDa, said surface antigen with a molecular weight of 15kDa and said surface antigen with a molecular weight of 15kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; or in the order of said surface antigen with a molecular weight of 15kDa, said surface antigen with a molecular weight of 15kDa, said surface antigen with a molecular weight of 15kDa and said surface antigen with a molecular weight of 15kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof.

8. The *Treponema pallidum* fused antigen as claimed in Claim 5, wherein said surface antigens are fused in the order of said surface antigen with a molecular weight of 47kDa, said surface antigen with a molecular weight of

17kDa, and said surface antigen with a molecular weight of 15kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 47kDa, said surface antigen with a molecular weight of 15kDa, and said surface antigen with a molecular weight of 17kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 15kDa, said surface antigen with a molecular weight of 17kDa, and said surface antigen with a molecular weight of 47kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 15kDa, said surface antigen with a molecular weight of 47kDa, and said surface antigen with a molecular weight of 17kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 17kDa, said surface antigen with a molecular weight of 15kDa, and said surface antigen with a molecular weight of 47kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 17kDa, said surface antigen with a molecular weight of 47kDa, and said surface antigen with a molecular weight of 15kDa in

view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 47kDa and said surface antigen with a molecular weight of 17kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 47kDa and said surface antigen with a molecular weight of 15kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 17kDa and said surface antigen with a molecular weight of 47kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 17kDa and said surface antigen with a molecular weight of 15kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 15kDa and said surface antigen with a molecular weight of 17kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 15kDa and said surface antigen

with a molecular weight of 15kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 15kDa, said surface antigen with a molecular weight of 15kDa and said surface antigen with a molecular weight of 15kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; or in the order of said surface antigen with a molecular weight of 15kDa, said surface antigen with a molecular weight of 15kDa, said surface antigen with a molecular weight of 15kDa and said surface antigen with a molecular weight of 15kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof.

9. The *Treponema pallidum* fused antigen as claimed in Claim 6, wherein said surface antigens are fused in the order of said surface antigen with a molecular weight of 47kDa, said surface antigen with a molecular weight of 17kDa, and said surface antigen with a molecular weight of 15kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 47kDa, said surface antigen with a molecular weight of 15kDa, and said surface antigen with a molecular weight of 17kDa in view of the sequence from an N-terminus thereof to a C-

terminus thereof; in the order of said surface antigen with a molecular weight of 15kDa, said surface antigen with a molecular weight of 17kDa, and said surface antigen with a molecular weight of 47kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 15kDa, said surface antigen with a molecular weight of 47kDa, and said surface antigen with a molecular weight of 17kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 17kDa, said surface antigen with a molecular weight of 15kDa, and said surface antigen with a molecular weight of 47kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 17kDa, said surface antigen with a molecular weight of 47kDa, and said surface antigen with a molecular weight of 15kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 47kDa and said surface antigen with a molecular weight of 17kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 47kDa and said surface antigen with a molecular weight



of 15kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 17kDa and said surface antigen with a molecular weight of 47kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 17kDa and said surface antigen with a molecular weight of 15kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 15kDa and said surface antigen with a molecular weight of 47kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 15kDa and said surface antigen with a molecular weight of 17kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 15kDa and said surface antigen with a molecular weight of 15kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 15kDa, said surface antigen with a molecular weight of 15kDa and said surface antigen with a molecular weight of 15kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; or in the order of said surface

antigen with a molecular weight of 15kDa, said surface antigen with a molecular weight of 15kDa, said surface antigen with a molecular weight of 15kDa and said surface antigen with a molecular weight of 15kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof.

10. An assay for anti-Treponema pallidum antibodies, comprising reacting a Treponema pallidum fused antigen in which at least two surface antigens of Treponema pallidum are fused with a sample in which said antibodies are to be detected.

11. An assay for anti-Treponema pallidum antibodies, comprising reacting a Treponema pallidum fused antigen in which at least three surface antigens of Treponema pallidum are fused with a sample in which said antibodies are to be detected.

12. An assay for anti-Treponema pallidum antibodies, comprising reacting a Treponema pallidum fused antigen in which two to three surface antigens of Treponema pallidum are fused with a sample in which said antibodies are to be detected.

13. The assay for anti-Treponema pallidum antibodies as claimed in Claim 10, wherein said at least two surface antigens of Treponema pallidum have a

molecular weight selected from 47kDa, 17kDa and 15kDa.

14. The assay for anti-Treponema pallidum antibodies as claimed in Claim 11, wherein said at least three surface antigens of Treponema pallidum have a molecular weight selected from 47kDa, 17kDa and 15kDa.

15. The assay for anti-Treponema pallidum antibodies as claimed in Claim 12, wherein said two to three surface antigens of Treponema pallidum have a molecular weight selected from 47kDa, 17kDa and 15kDa.

16. The assay for anti-Treponema pallidum antibodies as claimed in Claim 13, wherein said surface antigens are fused in the order of said surface antigen with a molecular weight of 47kDa, said surface antigen with a molecular weight of 17kDa, and said surface antigen with a molecular weight of 15kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 47kDa, said surface antigen with a molecular weight of 15kDa, and said surface antigen with a molecular weight of 17kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of

15kDa, said surface antigen with a molecular weight of 17kDa, and said surface antigen with a molecular weight of 47kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 15kDa, said surface antigen with a molecular weight of 47kDa, and said surface antigen with a molecular weight of 17kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 17kDa, said surface antigen with a molecular weight of 15kDa, and said surface antigen with a molecular weight of 47kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 17kDa, said surface antigen with a molecular weight of 47kDa, and said surface antigen with a molecular weight of 15kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 47kDa and said surface antigen with a molecular weight of 17kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 47kDa and said surface antigen with a molecular weight of 15kDa in view of the sequence from an N-terminus thereof to a C-terminus

thereof; in the order of said surface antigen with a molecular weight of 17kDa and said surface antigen with a molecular weight of 47kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 17kDa and said surface antigen with a molecular weight of 15kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 15kDa and said surface antigen with a molecular weight of 47kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 15kDa and said surface antigen with a molecular weight of 17kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 15kDa and said surface antigen with a molecular weight of 15kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 15kDa, said surface antigen with a molecular weight of 15kDa and said surface antigen with a molecular weight of 15kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; or in the order of said surface antigen with a molecular weight of 15kDa, said surface antigen with a molecular weight of

15kDa, said surface antigen with a molecular weight of 15kDa and said surface antigen with a molecular weight of 15kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof.

17. The assay for anti-Treponema pallidum antibodies as claimed in Claim 14, wherein said surface antigens are fused in the order of said surface antigen with a molecular weight of 47kDa, said surface antigen with a molecular weight of 17kDa, and said surface antigen with a molecular weight of 15kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 47kDa, said surface antigen with a molecular weight of 15kDa, and said surface antigen with a molecular weight of 17kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 15kDa, said surface antigen with a molecular weight of 17kDa, and said surface antigen with a molecular weight of 47kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 15kDa, said surface antigen with a molecular weight of 47kDa, and said surface antigen with a molecular weight of 17kDa in

view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 17kDa, said surface antigen with a molecular weight of 15kDa, and said surface antigen with a molecular weight of 47kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 17kDa, said surface antigen with a molecular weight of 47kDa, and said surface antigen with a molecular weight of 15kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 47kDa and said surface antigen with a molecular weight of 17kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 47kDa and said surface antigen with a molecular weight of 15kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 17kDa and said surface antigen with a molecular weight of 47kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 17kDa and said surface antigen with a molecular weight of 15kDa in view of the sequence from an N-terminus thereof to a

C-terminus thereof; in the order of said surface antigen with a molecular weight of 15kDa and said surface antigen with a molecular weight of 47kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 15kDa and said surface antigen with a molecular weight of 17kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 15kDa and said surface antigen with a molecular weight of 15kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 15kDa, said surface antigen with a molecular weight of 15kDa and said surface antigen with a molecular weight of 15kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; or in the order of said surface antigen with a molecular weight of 15kDa, said surface antigen with a molecular weight of 15kDa, said surface antigen with a molecular weight of 15kDa and said surface antigen with a molecular weight of 15kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof.

18. The assay for anti-Treponema pallidum antibodies as claimed in Claim 15, wherein said surface



antigens are fused in the order of said surface antigen with a molecular weight of 47kDa, said surface antigen with a molecular weight of 17kDa, and said surface antigen with a molecular weight of 15kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 47kDa, said surface antigen with a molecular weight of 15kDa, and said surface antigen with a molecular weight of 17kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 15kDa, said surface antigen with a molecular weight of 17kDa, and said surface antigen with a molecular weight of 47kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 15kDa, said surface antigen with a molecular weight of 47kDa, and said surface antigen with a molecular weight of 17kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 17kDa, said surface antigen with a molecular weight of 15kDa, and said surface antigen with a molecular weight of 47kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a

molecular weight of 17kDa, said surface antigen with a molecular weight of 47kDa, and said surface antigen with a molecular weight of 15kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 47kDa and said surface antigen with a molecular weight of 17kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 47kDa and said surface antigen with a molecular weight of 15kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 17kDa and said surface antigen with a molecular weight of 47kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 17kDa and said surface antigen with a molecular weight of 15kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 15kDa and said surface antigen with a molecular weight of 47kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 15kDa and said surface antigen with a molecular weight of 17kDa in view of the sequence from an N-terminus

thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 15kDa and said surface antigen with a molecular weight of 15kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; in the order of said surface antigen with a molecular weight of 15kDa, said surface antigen with a molecular weight of 15kDa and said surface antigen with a molecular weight of 15kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof; or in the order of said surface antigen with a molecular weight of 15kDa, said surface antigen with a molecular weight of 15kDa, said surface antigen with a molecular weight of 15kDa and said surface antigen with a molecular weight of 15kDa in view of the sequence from an N-terminus thereof to a C-terminus thereof.

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